9/15/81

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
PENNSYLVANIA POWER & LIGHT COMPANY	)	Docket Nos. 50-387
ALLEGHENY ELECTRIC COOPERATIVE, INC.	)	50-388
	)	
(Susquehanna Steam Electric Station, Units 1 and 2)	)	

NRC STAFF TESTIMONY OF FELIX B. LITTON
REGARDING CRACKING IN BWR CORE SPRAY
NOZZLES (Contention 7c)

Q.1. Please state your name and position with the NRC.

A.1. My name is Felix B. Litton and I am a Senior Materials Engineer, Materials Engineering Branch, Division of Engineering, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission.

Q.2. Have you prepared a statement of professional qualifications?

A.2. Yes. A copy is attached to this testimony.

Q.3. Please state the scope of your responsibilities for the review of the operating license application for the Susquehanna facility.

A.3. I am responsible for the review and evaluation of those sections of the Applicants Final Safety Analysis Report for which the Materials Application Section of the Materials

Engineering Branch has primary review responsibility. This responsibility includes a review of the materials used for the construction of the reactor coolant pressure boundary and methods for inspection to preserve component intergrity.

Q.4. What is the purpose of your testimony?

A.4. The purpose of my testimony is to address Contention 7c which states:

> The Nuclear Steam Supply Systems of Susquehanna 1 and 2 contain numerous generic design deficiencies, some of which may never be resolvable, and which, when reviewed together, render a picture of an unsafe nuclear installation which may never be safe enough to operate. Specifically:
>
> BWR core spray nozzles occasionally crack, a problem which reduces their effectiveness.

Q.5. Do you agree that BWR core spray nozzles occasionally crack?

A.5. No, I disagree.

Q.6. What is the basis for your disagreement?

A.6. There have been no incidents of BWR core spray nozzle cracking reported to the NRC Staff.

Q.7. But have there been incidents of cracking in core spray spargers, reactor vessel nozzle safe-ends, control rod drive return line nozzles, and feedwater system nozzles at operating BWR facilities?

A.7. Yes.

Q.8. Has the cause of the cracking in those BWR components and systems been determined?

A.8. Yes. The cracking in core spray spargers and reactor vessel nozzle safe-ends was attributed to intergranular stress corrosion of the sensitized materials in those components. The cracking in control rod drive return line nozzles and feedwater system nozzles was attributed to thermal fatigue.

Q.9. Has the NRC Staff established guidance for eliminating or reducing the susceptibility to cracking of the BWR components and systems listed in Q7 above?

A.9. Yes. NUREG-0313, Revision 1, "Technical Report on Material Selection and Processing Guidelines for BWR Coolant Pressure Boundary Piping," dated July 1980, sets forth methods acceptable to the NRC Staff for preventing or reducing the susceptibility to intergranular stress corrosion cracking of BWR components and systems. NUREG-0619, "BWR Feedwater Nozzle and Control Rod Drive Return Line Nozzle Cracking," dated November 1980, sets forth methods acceptable to the NRC Staff for eliminating concerns about cracking of nozzles in the control rod drive return lines and the feedwater system.

Q.10 What actions have the Applicants taken in response to the Staff's guidance?

A.10. The Applicants have replaced all the material in the core spray system which could be susceptible to intergranular stress corrosion cracking with material that is not susceptible as recommended in Section III of NUREG-0313, Revision 1. (See Section 5.2.3.2. of Supplement 2 to the SER). Materials that could be susceptible to intergranular stress corrosion cracking have not been used in the reactor vessel nozzle safe-ends of the Susquehanna units. Control rod drive return lines have been eliminated from the Susquehanna design, and the feedwater system has been redesigned. The latter two actions were taken in response to the recommendations of NUREG-0619.

Q.11. Do you believe that the actions taken or to be taken by the Applicants to eliminate cracking in BWR components and systems of the types discussed above in Q7 will assure that such cracking will not endanger the health and safety of the public?

A.11. Yes, because the Applicant's have followed the guidance set forth in NUREG-0313, Revision 1 and NUREG-0619 in resolving cracking problems.

PROFESSIONAL QUALIFICATIONS
FELIX B. LITTON

I am a Senior Materials Engineer in the Materials Engineering Branch of the Office of Nuclear Reactor Regulation, Nuclear Regulatory Commission. I am attached to the Materials Integrity Section and am responsible for the review and evaluation of materials and processes used in the construction and operation of components in the nuclear power industry.

My education consists of a B. S. (1936) and M. S. (1937) degree in Physical Chemistry from Virginia Polytechnic Institute, Blacksburg, Va. I have completed additional study in Material Science (1967) at the University of New Mexico and have taken special courses in Fracture Mechanics (1977) at George Washington University.

Prior to joining the Nuclear Regulatory Commission, my experience consists of metallurgical research related to the preparation, fabrication and alloy formation of new structural materials for nuclear, advanced aircraft and high temperature application. I have published in technical journals on the environmental behavior, thermodynamic stability and mechanical properties of uranium, plutonium, vanadium, zirconium, titanium, hafnium and silicon and their alloys. My experience in ferrous metallurgy relates to the cause of failure in service.